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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/637,105	08/08/2003	Ting-Chu Ko	N1085-00144	5068
8933	7590	01/04/2005	EXAMINER	
DUANE MORRIS, LLP IP DEPARTMENT ONE LIBERTY PLACE PHILADELPHIA, PA 19103-7396			SCHILLINGER, LAURA M	
			ART UNIT	PAPER NUMBER
			2813	

DATE MAILED: 01/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/637,105

Applicant(s)

KO ET AL.

Examiner

Laura M. Schillinger

Art Unit

2813

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 November 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 1-5 and 16-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 6-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- 1) ☐ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 8/8/03.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

Claims 1-5 and 16-20 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected claims, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 11/12/04

Claim Rejections - 35 USC § 102

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 6-8 and 12-15 are rejected under 35 U.S.C. 102(b) as being anticipated by Erb ('834).

Erb teaches the following claimed limitations as cited below:

6. A method for fabricating a metal alloy interconnect in a semiconductor device, comprising:
defining a metal alloy interconnect boundary profile on a substrate material (Fig.4(1));
subjecting the substrate material to a first wet process for fabricating an intermediate layer of the metal alloy interconnect conforming to the boundary profile (Fig.4 (5') and Col.7, lines: 1-15) ;

subjecting the substrate material having the intermediate layer to a second wet process for fabricating a main layer of the metal alloy interconnect containing a primary metal (Fig.4 (5) and Col.8-9, lines: 55-30 , wherein the intermediate layer has a relatively higher concentration of a

Art Unit: 2813

secondary metal than the main layer (Col.5, lines: 9-17- teaching that layer 5' could be copper and layer 5 could be a copper alloy).

7. The method of claim 6 wherein the first and second wet process includes at least one electro-chemical plating process Col.7, lines: 20-25 and Col.9, lines: 10-15).

8. The method of claim 6 wherein the first and second wet process includes at least one electroless plating process (Col.9, lines: 10-15).

12. The method of claim 6 wherein the primary metal is Cu (Col.5, lines: 10-15).

13. The method of claim 6 further comprising fabricating a seed layer before fabricating the intermediate layer so that the seed layer is underneath the intermediate layer (Col.8, lines: 50-55).

14. The method of claim 13 wherein the seed layer has pure primary metal (Col.8, lines: 50-55).

15. The method of claim 6 further comprising employing a chemical- mechanical process to form a coplanar surface of the intermediate and main layers (Col.9, lines:17-40).

Claim Rejections - 35 USC § 103

Art Unit: 2813

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Erb ('834) as applied to claim 6 above, and further in view of Rodbell et al ('129)

In reference to claim 11, Erb teaches the method of claim 6. However fails to teach wherein the first and second wet processes are further enhanced by adjusting plating temperatures in the processes, thereby adjusting a thermal budget for fabricating the metal alloy interconnect.

However, Rodbell et al (129) teaches another plating method where the temperature is controlled to account for the thermal budget (freezing point) (Col.9, lines: 23-35).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Erb's teachings to further include adjusting the plating temperatures as taught by Rodbell because as Rodbell teaches doing so enhances resistance transient and achieves good hole filling of high aspect ratio features by providing large grains (Col.5, lines: 35-45).

Allowable Subject Matter

Art Unit: 2813

The following is a statement of reasons for the indication of allowable subject matter: In reference to claims 9 and 10, prior art fails to teach nor suggest the combination of the method of claim 6 wherein the first wet process is controlled by using a relatively high bias voltage to create the relatively higher concentration of the secondary metal; nor does prior art teach nor suggest wherein the second wet process is controlled by using a relatively low bias voltage to maintain a relatively low concentration of the secondary metal. Consequently, claims 9 and 10 contain allowable subject matter.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Laura M. Schillinger whose telephone number is (571) 272-1697. The examiner can normally be reached on M-T, R-F 7:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl W. Whitehead, Jr. can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

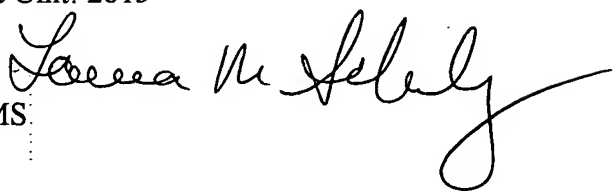
Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Application/Control Number: 10/637,105

Page 6

Art Unit: 2813

LMS:

A handwritten signature in black ink, appearing to read "Laree M. Healy". The signature is written in a cursive style with a large, looping "H" and a long, sweeping underline.

12/29/04